

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claims 1-54 (cancelled)

55. (New) An illumination apparatus provided in an exposure apparatus which exposes an object with an illumination beam via a mask to illuminate with the illumination beam an area on a predetermined plane on which a pattern surface of the mask is placed, comprising:

an illumination optical system provided on an optical path through which the illumination beam passes, that includes a plurality of optical members arranged along an optical axis substantially perpendicular to the predetermined plane of which the area is illuminated via the plurality of optical members with the illumination beam having one of plural intensity distributions different from each other on a pupil plane of the illumination optical system; and

a shaping optical system provided on the optical path in the illumination optical system to shape the plural intensity distributions of which a first one has an increased intensity

portion apart from the optical axis relative to a portion of the first intensity distribution on the optical axis, that includes diffraction optical elements of which one is provided on the optical path to shape the first intensity distribution and is exchanged for another one of the diffraction optical elements to shape a second one of the plural intensity distributions different from the first intensity distribution.

56. (New) An apparatus according to claim 55, wherein said shaping optical system includes zoom lenses on said optical axis relatively movable in a direction along said optical axis to change at least a size of the increased intensity portion of said first intensity distribution.

57. (New) An apparatus according to claim 55, wherein at least one of a position, relative to said optical axis, and a size of the increased intensity portion of said first intensity distribution is variable by said shaping optical system.

58. (New) An apparatus according to claim 55, wherein said first intensity distribution has increased intensity portions, apart from said optical axis relative to said portion on said optical axis, of which distances from said optical axis

are substantially equal.

59. (New) An apparatus according to claim 55, wherein said illumination optical system includes a shielding member provided on said optical path to prevent from reaching said mask unwanted light generated in said shaping optical system.

60. (New) An apparatus according to claim 59, wherein said unwanted light is generated from one of said diffraction optical elements provided on said optical path.

61. (New) An apparatus according to claim 55, wherein said one diffraction optical element provided on said optical path to shape said first intensity distribution generates a diffracted beam in a direction different from said optical axis with said illumination beam.

62. (New) An apparatus according to claim 55, wherein said one diffraction optical element provided on said optical path to shape said first intensity distribution restrains generation of a beam in a direction along said optical axis.

63. (New) An apparatus according to claim 62, wherein each of said diffraction optical elements is a phase shift type.

64. (New) An apparatus according to claim 55, wherein one of said diffraction optical elements on said optical path is disposed on a plane substantially conjugate with said predetermined plane in said illumination optical system.

65. (New) An apparatus according to claim 55, wherein said first intensity distribution is shaped in an off-axis illumination mode that includes a multipole mode in which said first intensity distribution has increased intensity portions, apart from said optical axis relative to said portion on said optical axis, of which distances from said optical axis are substantially equal.

66. (New) An apparatus according to claim 65, wherein said shaping optical system changes positions of each of said increased intensity portions in orthogonal first and second directions on said pupil plane, respectively.

67. (New) An apparatus according to claim 65, wherein said multipole mode includes at least one of a dipole mode in

which said increased intensity portions are two to illuminate a mask of which a pattern includes features periodically arranged in one direction with said illumination beam of which said first intensity distribution has two increased intensity portions and a quadrupole mode in which said increased intensity portions are four to illuminate a mask of which a pattern includes features periodically arranged in two different directions with said illumination beam of which said first intensity distribution has four increased intensity portions.

68. (New) An apparatus according to claim 67, wherein said two increased intensity portions in said dipole mode are respectively arranged at positions, on said pupil plane, of which distances from said optical axis with respect to said one direction are substantially equal.

69. (New) An apparatus according to claim 67, wherein said four increased intensity portions in said quadrupole mode are respectively arranged at positions, on said pupil plane, of which first distances from said optical axis with respect to one of said two different directions are substantially equal and of which second distances from said optical axis with respect

to another of said two different directions are substantially equal.

70. (New) An apparatus according to claim 65, wherein said increased intensity portions are defined so that an optical gravity center of said first intensity distribution is substantially coincident with said optical axis.

71. (New) An apparatus according to claim 65, wherein said increased intensity portions are defined so that an incident angle of the illumination beam from each one of said increased intensity portions satisfies the following relation:

$$\sin \phi = \lambda / 2P$$

where ϕ is the incident angle, λ is a wavelength of the illumination beam, and P is a pitch of a pattern on said mask.

72. (New) An apparatus according to claim 65, wherein said increased intensity portions are disposed on a pair of first line segments substantially parallel to a first direction perpendicular to a second direction in which features of a pattern on said mask are periodically arranged, the pair of first line segments being defined apart from said optical axis by a first distance in the second direction.

73. (New) An apparatus according to claim 72, wherein said increased intensity portions are disposed on said pair of first line segments and a pair of second line segments substantially parallel to said second direction, the pair of second line segments being defined apart from said optical axis by a second distance in said first direction.

74. (New) An apparatus according to claim 73, wherein said increased intensity portions are disposed on crossing points of said pair of first line segments and said pair of second line segments.